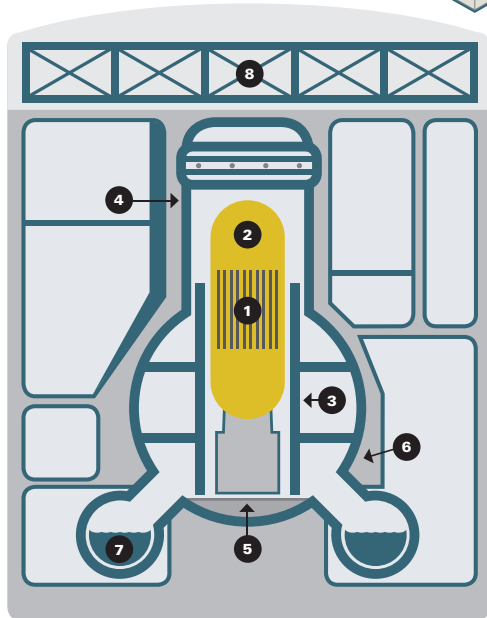
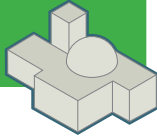


LESSONS LEARNED FROM FUKUSHIMA: FILTRATION STRATEGIES TO PROTECT PUBLIC SAFETY AND THE ENVIRONMENT

Boiling Water Reactor Containment Structures



- 1** REACTOR FUEL RODS
- 2** REACTOR PRESSURE VESSEL
- 3** REACTOR SHIELD
- 4** STEEL DRYWELL
- 5** CONCRETE CONTAINMENT FLOOR
- 6** SECONDARY CONCRETE SHIELD CONTAINMENT WALL
- 7** SUPPRESSION POOL
- 8** REACTOR BUILDING
- STEEL REINFORCED CONCRETE



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America's nuclear industry has learned from events such as Three Mile Island and the recent nuclear accident in Japan, and has incorporated this information into additional safety equipment, processes and procedures followed by employees at nuclear energy facilities every day.

The Fukushima accident reinforces the critical importance of technologies and systems that protect the public and the environment from the impact of unforeseen natural events. The industry's safety approach to respond to any extreme natural event includes layer upon layer of backup safety equipment, such as generators, pumps, battery banks – both onsite and at regional response centers.

Nuclear facilities have different designs and each option, or combination of options below, is a possible way to achieve the goal of preventing the release of potentially harmful materials in the event of an accident. After numerous other safety measures have been taken, one of these filtration approaches could be used to prevent the release of radioactive particles.

PREVENTING RADIOACTIVE RELEASE – THE ROLE OF WATER

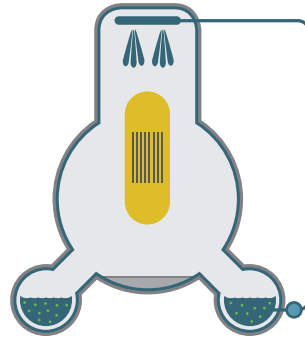
Water is important in two ways during regular nuclear power plant operations, helping transfer heat and as a cooling mechanism. In potential accident scenarios, in addition to cooling, water can also help remove radioactive particles to prevent release into the environment.

FILTERING OPTIONS

INTERNAL

EXTERNAL

FILTERING WITH COOLING WATER SPRAYS



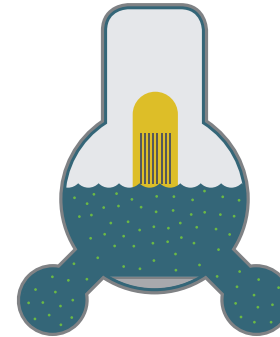
FUNCTION:

- Controls pressure to prevent or reduce the release of radiation from over pressurization
- Provides a steady supply of water to condense steam and control containment temperature and pressure
- If fuel is damaged, the sprays filter radioactive particles by washing them into suppression pools under the reactor

IMPACT:

- Prevents the release of radioactive particles into the environment
- Filters potential releases to trap radioactive particles

FILTERING WITH COOLING WATER IMMERSION



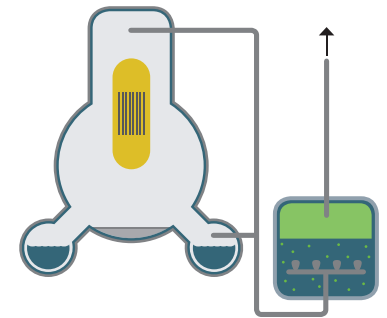
FUNCTION:

- Partially fills the structure with water
- Helps cool fuel if an accident occurs that includes damage to the reactor
- Traps radioactive particles in the water, thus preventing a release outside of the containment structure

IMPACT:

- Keeps the reactor vessel temperature low, helping to cool the fuel inside of the reactor vessel
- Cools damaged fuel that has melted through the reactor vessel
- Traps radioactive particles in the water inside the containment structure, thus preventing a release

FILTERING THROUGH EXTERNAL WATER TANKS



FUNCTION:

- Controls pressure and subsequently temperature through venting allowing more effective heat removal from the reactor
- If fuel is damaged, controls pressure and traps radioactive particles in the venting line

IMPACT:

- Traps radioactive particles inside the filter or filter tank
- Avoids build-up of hydrogen gas pressure in the containment structure, preventing leakage into adjacent buildings, as happened in the Fukushima accident